

REMARKS

Claims 1-6, all the claims pending in the application, stand rejected. In addition, the Examiner objects to claim 6.

Preliminary Matters:

The Applicant has amended claims 1, 5 and 6. In particular, even though the Examiner has not raised an objection to claims 1, 5 and 6 for lack of antecedent basis, Applicant noted that in each claim, the limitation relating to semi-transparent composition makes reference to "said image representing the highlight," and that there is no earlier reference in each claim to "an image representing the highlight." Thus, Applicant has amended each claim in order to state that the highlight position calculation concerns the calculation of a position of an image representing a highlight. This addition is consistent with the description of the invention beginning at page 7, line 22 and extending to page 8, line 12. There, it is clear that the highlight object 52 is arranged at the highlight position HP and that the highlight object 52 is a texture image, as shown in Fig. 4 that is mapped onto the soccer pitch object 54.

Claim Rejections -35 U.S.C. §101

Claim 6 is rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter. Applicants respectfully traverse this rejection for at least the following reasons.

The Examiner states that the claim discloses an information storage medium for storing a program for causing a computer to function. This rejection is not understood by Applicants since the U.S. Court of Appeals for the Federal Circuit has decided that a program product (storage medium) containing a computer program is patentable subject matter. *In re Beauregard* 35 U.S.P.Q.2d (BNA) 1383 (Fed. Cir. 1995). Moreover, the USPTO guidelines for computer related inventions clearly indicate that such subject matter is considered patentable under the U.S. Patent law. Accordingly, Applicant respectfully requests that this rejection be withdrawn.

Claim Rejections - 35 U.S.C. § 103

Claims 1-6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Randel (6,362,822) in view of Drebin et al (6,639,595). Applicant respectfully traverses this rejection for at least the following reasons.

As preliminary matter, Applicant would emphasize that the present invention relates to an image processing device and method that uses a technique for expressing a highlight with relatively light processing load. The invention is intended to facilitate the display of highlight features on an object, where a processor has limited capability, such as a household game machine 46 with microprocessor 14, as explained at pages 6 and 7 of the present application. In order to accomplish this result, the image of a highlight object is (1) generated, (2) appropriately positioned and (3) overlayed in parallel onto a main display object, as illustrated in Fig. 2.

The Applicant has discovered that, in order to properly create a position, the highlight object image, such as the one illustrated in Fig. 4, several distinct and unique processing steps are required. First, a position of a light source LP as well as a viewpoint position VP and viewing direction VD must be acquired, either from memory if predetermined or by calculation, as explained at page 10, lines 15-25. Given these basic parameters, then a highlight position HP is determined taking into consideration the light source position LP and the viewpoint position VP, as illustrate din Fig. 6 and explained at pages 10 and 11. The highlight position may be based upon viewpoint position VP, viewing direction VD and light source position LP.

With the position HP having been determined, a highlight intensity calculation is performed to determine a semitransparent composition rate used for semitransparent composition of the image representing a highlight onto the image representing the object as explained at page 11, lines 9-17. The intensity is based upon the viewing direction VD and the direction connecting two of the light source position LP, viewpoint position VP and highlight position HP.

Finally, the image representing a highlight and the image representing an object are overlayed based on the highlight position HP and the semitransparent composition rate corresponding to the intensity calculated by the highlight intensity calculation unit 68. The semitransparent composition rate is controlled on a basis described at page 9 and illustrated in Fig. 7, namely, an angle beta between a light segment obtained by projecting the line segment between the viewpoint position VP and the light source position LP to the object and the line segment obtained by projecting the viewing direction VD to the object.

The foregoing features are reflected in each of independent claims 1 (apparatus), 5 (method) and 6 (program product). The claims clearly define a semitransparent composition

function for combining the image representing a highlight onto the image representing an object based on (1) the calculated highlight position and (2) a semitransparent composition rate corresponding to a calculated intensity. Applicant respectfully submits that nothing of this sort is taught in the prior art.

Randel

The Examiner points to selected teachings in Randel at cols. 5 and 6, particularly with regard to Fig. 2, and identifies a display, camera and world space coordinate system 20 for a 3D object, light sources and camera. The Examiner asserts that it would be "inherent" that there exists a light source, viewpoint position and viewing direction acquisition means in order to define the spatial relationship. The Examiner's premise in this regard is mistaken since the law of inherency requires that the limitations must necessarily flow from the disclosure in the reference. Inherent anticipation requires that the missing descriptive material is "necessarily present," not merely probably or possibly present, in the prior art. *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citing *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991)). Applicant submits that a viewpoint position and viewing direction may not be necessary or at least may not be acquired, and not used to define a spatial relationship. Thus, the Examiner is kindly requested to provide teachings that show such features in a display of a three dimensional object.

Even if such secondary art may be obtained, Applicant notes that the Examiner admits that Randel does not disclose (1) a highlight position, (2) highlight intensity calculation means, (3) semitransparent composition means or (4) input display means for displaying a composition image. The Examiner looks to Drebin et al for such teaching.

Moreover, Applicant notes that the processing disclosed in Randel is of the complicated type, as evidenced by the summary at col. 4, lines 50-65, where complex rendering, transforming, modifying and multiplying steps are required. Even though Randel uses transformation tables 51H-51I to reduce processing time in certain of these steps, as explained at col. 7 and 8, there is no teaching that a highlight may be applied to an object with these tables. Moreover, even though a frame buffer 50 is used, there is no teaching or suggestion that such a device may be used to overlay calculated a highlight object onto another main object. In short,

there is no teaching or suggestion of the simple process of merely overlaying a highlight image onto a main object, as in the present invention.

Drebin et al

The Examiner points to the use of a 1D texture map 308 in Fig. 10b, having four different types of texels that are used to provide cartoon-like lighting effects. The Examiner notes that the effects are provided on the basis of an angle that light makes with an object or the distance of an object from a light source and that this determines the color resulting from the output of a texture mapping operation 306 in Fig. 7, as disclosed at col. 11, lines 10-17. The Examiner then asserts that all of the components missing from Randel are present in Drebin et al.

First, Applicant respectfully submits that Drebin et al discloses a complex image processing device that is not concerned with and does not teach the processor-resource saving techniques of the present invention. The disclosed system uses conventional lighting based shading (such as Gouraud or Phong shading - distinguished by Applicants in the specification) as well as lighting equations as additional enhancements to generate a texture coordinate (with other parameters inputted) to provide further results that only indirectly affects color and/or opacity, as described at col. 3, lines 16-60.

Second, Applicant submits that the Examiner must particularly point out the specific components and functions in Drebin et al that meet each claim limitation. Applicant asserts that on the basis of Applicant's review of the reference, such correspondence cannot be found.

Applicant's review indicates that Drebin et al concerns a 3D computer graphics system 50 that can be used to play interactive 3D video games. Drebin illustrates in Figs. 3 and 4 a logical flow diagram for the graphics processor 154, which includes several processors and a graphics pipeline 180, which contains a transform unit 300, rasterizer 400, texture units 500, 600 and pixel engine 700.

Notably, there is no component in the illustrated system of Fig. 4 that provides a combination of highlight image and object image as set forth in the claim. The pixel engine 700 performs a pixel blending function, but this is a complex function that the present invention attempts to avoid. As described at cols. 9-11, the transform unit 300 performs lighting function. This lighting is performed as a per-vertex calculation such that a color value is computed for

every lit vertex and the colors are linearly interpolated over the surfaces of each lit triangle using Gouraud shading. The calculations are made on a polygon-by-polygon basis and are not done on an overall image basis as in the present invention. Thus, the processing as necessarily carried out is complex and requires a significant allocation of the processing resources of the system.

The transform unit 300 is explained in detail with regard to Figs. 12-20, including the disclosure of a lighting pipeline for lighting calculation 302. As explained at col. 14, this unit performs calculations on a per-vertex basis, again, suggesting a complex conventional approach that is avoided by the present invention.


The only description referred to by the Examiner in framing the rejection is at col. 11, with regard to Fig. 10b. This disclosure concerns a vertex-by-vertex calculation, rather than an image overlapping the calculation. Even if the Examiner refers to the lighting pipeline implementation of Fig. 11, as described at col. 12, lines 65 - col. 14, line 44, a review of this description illustrates its complexity and a clear difference from the present invention. In short, Applicants respectfully submits that nothing in Drebin et al teaches the subject matter of the present invention.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Amendment Under 37 C.F.R. § 1.111
U.S. Application No. 10/718,644

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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